Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of detecting chemiluminescent emissions on a two-dimensional solid support having a surface layer, the method comprising:

contacting the surface layer of the solid support with a composition comprising a first chemiluminescent 1,2-dioxetane substrate capable of being activated by a first enzyme to produce a first chemiluminescent signal;

detecting the first chemiluminescent signal on the surface layer of the solid support;

contacting the surface layer of the solid support with a composition comprising a second 1,2-dioxetane chemiluminescent substrate capable of being activated by a second enzyme to produce a second chemiluminescent signal; and

detecting the second chemiluminescent signal on the surface layer of the solid support;

wherein a plurality of probes are ~~located~~ immobilized in a plurality of discrete areas on the surface layer at a density of at least 50 discrete areas per cm^2, wherein at least some of the probes are bound to a first enzyme conjugate comprising the first enzyme prior to contacting the surface layer of the solid support with the composition comprising the first chemiluminescent substrate, and wherein at least some of the probes are bound to a second enzyme conjugate comprising the second enzyme prior to

contacting the surface layer of the solid support with the composition comprising the second chemiluminescent substrate; and

wherein the composition comprising the first chemiluminescent substrate and the composition comprising the second chemiluminescent substrate are contacted with the surface layer in the presence of a composition comprising an onium polymer or an onium copolymer chemiluminescent quantum yield enhancing material.

2. (Canceled).

3. (Previously Presented) The method of Claim 1, wherein the first and second enzyme conjugates are each bound indirectly to the probes.

4. (Original) The method of Claim 3, wherein the first and second enzyme conjugates are bound to first and second target molecules, respectively, and wherein the first and second target molecules are each bound to a probe.

5. (Previously Presented) The method of Claim 4, wherein the first and second enzyme conjugates comprise conjugates of an antibody and an enzyme and wherein the first and second target molecules comprise an antigen moiety capable of being bound by the antibody.

6. (Cancel).

7. (Original) The method of Claim 1, wherein the first and second enzyme conjugates are each bound directly to probes.

8. (Previously Presented) The method of Claim 1, further comprising contacting the surface layer with a composition comprising the chemiluminescent quantum yield enhancing material before contacting the surface layer with the composition comprising the first chemiluminescent substrate.

9. (Original) The method of Claim 1, wherein the density of discrete areas on the surface layer is at least 100 discrete areas per cm^2.

10. (Original) The method of Claim 1, wherein the density of discrete areas on the surface layer is at least 1,000 discrete areas per cm^2.

11-12. (Canceled).

13. (Currently Amended) The method of Claim 1, further comprising:

contacting the surface layer with a sample comprising first target molecules labeled with a first label and contacting the surface layer with a sample comprising second target molecules labeled with a second label prior to contacting the ~~support~~ surface layer with the composition comprising the first chemiluminescent substrate;

wherein the first target molecules are labeled with the first enzyme to form the first enzyme conjugate and the second target molecules are labeled with the second enzyme to form the second enzyme conjugate; or

wherein the first target molecules are labeled with a group capable of binding to the first enzyme conjugate and the second target molecules are labeled with a group capable of binding to the second enzyme conjugate.

14-15. (Canceled).

16. (Original) The method of Claim 13, wherein the first target molecules comprise a first pool of target nucleic acids and wherein the second target molecules comprise a second pool of target nucleic acids.

17. (Previously Presented) The method of Claim 16, wherein the first and second pools of target nucleic acids each comprise mRNA transcripts of one or more genes.

18. (Previously Presented) The method of Claim 16, wherein the first and second pools of target nucleic acids each comprise cDNA or cRNA.

19. (Currently Amended) The method of Claim 17, wherein: the first and second pools of target nucleic acids each have a concentration of target nucleic acids; the one or more genes each have an expression level; and the concentration of the target nucleic acids in the first and second pools of target nucleic acids is proportional to the expression level of the genes encoding the target nucleic acid.

20. (Canceled)

21. (Previously Presented) The method of Claim 1, wherein detecting the first chemiluminescent signal comprises determining the location on the surface layer of the first chemiluminescent signal and wherein detecting the second chemiluminescent signal comprises determining the location on the surface layer of the second chemiluminescent signal.

22. (Previously Presented) The method of Claim 21, wherein control probes are located in one or more discrete areas on the surface layer.

23. (Previously Presented) The method of Claim 22, wherein the control probes are co-located in one or more of the same discrete areas as the plurality of probes.

24. (Currently Amended) The method of Claim 1, wherein fluorescent labels are attached directly or indirectly to ~~the surface layer~~ a probe.

25. (Original) The method of Claim 1, wherein the first chemiluminescent signal and the second chemiluminescent signal have different emission maxima.

26. (Currently Amended) The method of Claim 25, wherein the first and second chemiluminescent signals each have an intensity and wherein detecting the second chemiluminescent signal comprises:

filtering the emissions from the surface layer with a filter adapted to reduce the intensity of the first chemiluminescent signal relative to the intensity of the second chemiluminescent signal; and

detecting the second chemiluminescent signal.

27. (Original) The method of Claim 1, wherein the first chemiluminescent signal and the second chemiluminescent signal have approximately the same emission maxima.

28. (Original) The method of Claim 1, wherein the composition comprising the first chemiluminescent substrate and the composition comprising the second chemiluminescent substrate are buffered compositions.

29. (Original) The method of Claim 13, further comprising quantifying the amount of the first and the second target molecules in the sample.

30. (Currently Amended) The method of Claim 29, wherein a fluorescent label which emits a signal is attached either directly or indirectly to ~~the surface layer~~ a probe, the first and the second chemiluminescent signal each have an intensity, and ~~wherein~~ quantifying comprises comparing the intensity of the first and/or the second chemiluminescent signals to the intensity of the signal from the fluorescent label.

31. (Previously Presented) The method of Claim 13, further comprising washing the surface layer of the solid support after contacting the surface layer with the sample comprising the first target molecule and before contacting the surface layer with the composition comprising the first chemiluminescent substrate.

32. (Original) The method of Claim 1, further comprising washing the surface layer of the solid support after detecting the first chemiluminescent signal and before contacting the surface layer with the second chemiluminescent substrate composition.

33. (Canceled).

34. (Original) The method of Claim 1, wherein either of the first or second enzymes is β-galactosidase and the other enzyme is alkaline phosphatase.

35. (Previously Presented) The method of Claim 34, wherein the composition comprising the chemiluminescent substrate capable of being activated by the alkaline phosphatase enzyme comprises a 0.1 M solution of aminomethylpropanol and 1 mM $MgCl_2$ at a pH of 9.5.

36. (Previously Presented) The method of Claim 34, wherein the composition comprising the chemiluminescent substrate capable of being activated by the β-

galactosidase enzyme comprises a 0.1 M solution of sodium phosphate and 1 mM $MgCl_2$ at a pH of 7.0.

37. (Currently Amended) The method of Claim [[15]] 13, further comprising contacting the surface layer with a composition comprising the first and second enzyme conjugates.

38. (Previously Presented) The method of Claim 37, wherein the first and second enzyme conjugates comprise conjugates of an antibody and an enzyme and wherein the first and second target molecules are labeled with an antigen capable of being bound by the antibody.

39. (Original) The method of Claim 1, wherein the first chemiluminescent substrate is a 1,2-dioxetane substrate and the second chemiluminescent substrate is selected from the group consisting of an acridan ester substrate, an acridan thioester substrate, an enol phosphate substrate, an acridan enol phosphate substrate, and a luminol substrate.

40. (Currently Amended) The method of Claim 1, wherein the chemiluminescent quantum yield enhancing material is an onium polymer selected from the group consisting of poly(vinylbenzylammonium) salts[[)]], poly(vinylbenzylphosphonium) salts[[)]] and poly(vinylbenzylsulfonium) salts[[)]].

41. (Previously Presented) The method of Claim 1, wherein the chemiluminescent quantum yield enhancing material is an onium copolymer.

42. (Currently Amended) The method of Claim 1, wherein the composition comprising the chemiluminescent quantum yield enhancing material further comprises an additive selected from the group consisting of bovine serum albumin (BSA), cyclodextrins, negatively charged salts, alcohols, polyols, poly(2-ethyl-Z-oxazoline), zwitterionic surfactants, anionic surfactants, cationic surfactants, and neutral surfactants.

43. (Previously Presented) The method of Claim 1, wherein the composition comprising the chemiluminescent quantum yield enhancing material further comprises counterion moieties selected from the group consisting of halide, sulfate, alkylsulfonate, triflate, arylsulfonate, perchlorate, alkanoate, arylcarboxylate and combinations thereof.

44. (Currently Amended) The method of Claim 5, wherein the first ~~or second~~ enzyme conjugate is an antidigoxigenin:enzyme conjugate and wherein the ~~corresponding~~ first target molecules are labeled with digoxigenin.

45. (Original) The method of Claim 44, wherein the target molecules labeled with digoxigenin comprise cDNA.